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*Published in:*  
BMJ Evidence-Based Medicine

*DOI:*  
[10.1136/bmjebm-2019-111220](https://doi.org/10.1136/bmjebm-2019-111220)

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*Recommended citation(APA):*  
Albarqouni, L., Glasziou, P., Bakhit, M., Del Mar, C., & Hoffmann, T. C. (2020). Development of a contemporary evidence-based practice workshop for health professionals with a focus on pre-appraised evidence and shared decision-making: a before-after pilot study. *BMJ Evidence-Based Medicine*, 25(2), 49-55.  
<https://doi.org/10.1136/bmjebm-2019-111220>

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# **Development of a contemporary evidence-based practice workshop for health professionals with a focus on pre-appraised evidence and shared decision making: a before-after pilot study**

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**Manuscript word count:** 2739

**Abstract word count:** 214

**Tables and Figures:** 3 tables, 1 Supplementary Figure, 2 Supplementary material

**References:** 35

**Journal:** EBM BMJ

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## Abstract

Shared decision making (SDM) has emerged as a key skill to assist clinicians in applying evidence-based practice (EBP). We aimed to develop and pilot a new approach to teaching EBP, which focuses on teaching knowledge and skills about SDM and pre-appraised evidence. We designed a half-day workshop, informed by an international consensus on EBP core competencies, and invited practicing clinicians to participate. Skills in SDM and communicating evidence were assessed by audio-recording consultations between clinicians and standardised patients (immediately pre- and post-workshop). These were rated by two independent assessors using the OPTION (Observing Patient Involvement, 0-100 points) and ACEPP (Assessing Communication about Evidence and Patient Preferences, 0-5 points) tools. Participants also completed a feedback questionnaire (9 Likert scale and 4 open-ended questions). Fourteen clinicians participated. Skills in SDM and communicating research evidence improved from pre- to post- workshop (mean increase in OPTION score = 5.5, 95% CI 1.0 to 9.9; increase in ACEPP = 0.5, 95% CI, 0.02 to 1.06). Participant feedback was positive, with most indicating 'agree' or 'strongly agree' to the questions. A contemporary approach to teaching clinicians EBP, with a focus on SDM and pre-appraised evidence, was feasible, perceived as useful, and showed modest improvements in skills. Results should be interpreted cautiously because of the small study size and pre-post design.

### **What is already known about this subject?**

- The focus of EBP teaching is commonly on detailed critical appraisal skills often to the exclusion of other steps (i.e. the application of evidence using SDM skills in particular) which has been criticised.
- The integration of SDM training within evidence-based practice (EBP) training to capitalise on closely aligning the approaches has been advocated.
- A single study has evaluated a similar approach, however, in the context of a semester-long university subject on EBP, rather than with busy clinicians.

### **What are the new findings?**

- A contemporary approach of teaching EBP to clinicians, with a focus on SDM and using pre-appraised evidence, was feasible and perceived as useful.
- Feedback from participants after the workshop was positive, with emphasis on the usefulness of small-group sessions.
- There was a small increase in clinicians' skills in SDM and communicating evidence with patients from before to after the workshop.

### **How might it impact on clinical practice in the foreseeable future?**

- It might impact the approach of EBP teaching by driving a shift from the more traditional approach (in which it is expected that clinicians need to be fully competent in all the 5 EBP steps, including detailed critical appraisal of research evidence) to a contemporary approach (in which the focus is on providing clinicians with the skills to critically interpret synthesised or pre-appraised evidence and apply its findings to patients by using SDM).

## Background

Shared decision making (SDM) provides a process for incorporating research evidence, along with the patient's values, preferences, and circumstances, into the patient-clinician discussions about a health decision<sup>1 2</sup>. Despite the growing attention of the importance of SDM to quality patient care<sup>3</sup>, there is generally low levels of SDM use in clinical practice<sup>4</sup>. A Cochrane review of interventions for increasing the uptake of SDM found that training clinicians in SDM can improve the use of SDM in practice<sup>5</sup>. However, evidence about how best to teach SDM is scarce<sup>6 7</sup>. Many existing SDM training interventions are disease-specific<sup>8-12</sup> and few have evaluated general SDM training<sup>13-15</sup>. The integration of SDM training within evidence-based practice (EBP) training to capitalise on closely aligning the approaches has been advocated<sup>2 16</sup>. Only one study has evaluated this approach, however, it was conducted in the context of a semester-long university subject on EBP, rather than with busy clinicians<sup>15</sup>.

EBP is the integration of the best available research evidence with clinical expertise and patient's values and preferences (i.e. personal concerns, expectations, cultural influences and individual characteristics during the clinical encounter)<sup>17 18</sup>. EBP has been mostly taught according to the traditional approach following the 5 EBP steps addressed in order: asking clinical questions, searching for evidence, critically appraising the evidence, applying to the individual patient, and evaluating the process<sup>19</sup>. However, the focus of EBP teaching is commonly on detailed critical appraisal skills often to the exclusion of other steps (i.e. the application of evidence using SDM skills in particular) which has been criticised<sup>2 20-22</sup>. There are calls for a shift from the more traditional approach of EBP education (in which it is expected that clinicians need to be fully competent in all 5 EBP steps, including the detailed critical appraisal of research evidence) to a contemporary approach, in which the focus is on providing clinicians with the skills to critically interpret synthesised or pre-appraised evidence and apply its findings to patients by using shared decision making<sup>2 23-25</sup>.

Pre-appraised evidence (i.e. evidence-based sources that are vetted by experts and updated regularly to accommodate the newest evidence<sup>26</sup>) represents one partial solution to help busy clinicians by providing timely condensed updated summaries of research evidence<sup>27-29</sup>. Resources for pre-appraised evidence vary in their degree of quality and accuracy. Some resources are BMJ Best Practice and Rapid Recommendation, UpToDate, and other trustworthy evidence-based guidelines. For instance, An international multicentre study of 248 clinicians (working primarily in general internal medicine or family medicine in 10 different countries) suggested that strategies to increase clinicians' competencies in EBP, to better understand or interpret pre-appraised evidence, are still needed<sup>30</sup>. This study aimed to assess the feasibility and clinicians' acceptability of a new approach to teaching EBP, which focusses on SDM and uses pre-appraised evidence. We also aimed to explore the effect of this workshop on clinicians' SDM and evidence communication skills.

## Methods

### *Design*

A single-arm before and after pilot study of an educational module.

### *Study population, recruitment, and eligibility*

We initially intended to recruit general practitioners (GPs) working within primary healthcare but recruitment difficulties led us to extend to other health professionals. To be included, participants had to be registered and practicing clinician working in any Australian state or territory. We advertised for this workshop using social media (Twitter accounts with combined > 5000 followers; GP Down Under Facebook group with > 6000 GPs), and by sending targeted email invitations to clinicians working at the local university hospital (Gold Coast University Hospital, Queensland, Australia).

### *Intervention*

We developed the EBP workshop based on:

(i) an international consensus on core competencies in EBP: workshop content was informed by a previously developed international consensus list of the most essential core competencies in EBP that should be covered in EBP training programs<sup>25</sup>. For example, we integrated the teaching of SDM skills as a core element in EBP training and focussed on pre-appraised evidence and the interpretation of GRADE framework (The Grading of Recommendations Assessment, Development and Evaluation) – which are also on the consensus list.

(ii) an analysis of the type and topic of the most frequently asked clinical questions by general practitioners in social media: We used information from a previous analysis of the most frequently asked clinical questions on a very popular Facebook group (GP Down Under; >6000 members), in which we identified the most common presenting conditions (i.e. clinical topics such as skin, mental health) and most common type of clinical questions (e.g. treatment or diagnostic) posted<sup>31</sup>. We used information regarding the type (e.g. treatment, prognosis, diagnosis) and topic (e.g. depression, acute otitis media, cardiovascular risk disease prevention) of the most frequently posted clinical questions, to hone the clinical scenarios and practical exercises of our EBP workshop. For example, the decision to focus on a treatment scenario and evidence about knee osteoarthritis/pain was based on the analysis of these clinical questions.

We developed this workshop with a focus on integrating SDM training and EBP training through providing video demonstration (to model the skills) followed by teaching how to interpret and communicate research evidence and decision aids. **Table 1** contains the detailed description of the intervention using the Template for Intervention Description and Replication (TIDier)<sup>32</sup> and the guideline for reporting evidence-based practice educational interventions and teaching (GREET)<sup>33</sup>. Workshop materials are presented in **Supplement 1** and **2**. The EBP training program evaluated in this study is envisioned as the

first of a series of modules and that future modules would address different types of evidence (e.g. diagnosis, prognosis).

**Table 1.** Description of the EBP workshop intervention, using TIDieR items<sup>32</sup>.

TIDieR Items	Description
1. Brief Name	Evidence-based practice workshop for clinicians, with a focus on shared decision making and using pre-appraised research evidence
2. Why	There is a growing interest in contemporary EBP training (i.e. aim for clinicians to be competent in the critical interpretation of pre-appraised evidence and applying its findings in practice using shared decision making) instead of the more traditional approach of EBP education (i.e. ‘evidence-based clinicians need to be fully competent in all the 5 EBP steps including detailed critical appraisal of research evidence).
3. What (Materials)	<p><b>Materials provided to participants:</b> Each participant was provided with a workshop workbook which includes the workshop program, interactive activities (including a brief summary of the patient scenario that would be worked through in the workshop, extracts from the selected guideline and articles, suggested readings (e.g. types of clinical questions, and a summary of study designs and level of evidence), critical appraisal sheets, and a glossary of frequently used epidemiological terms. The workbook can be found in <b>Supplement 1</b>.</p> <p><b>Materials used in the workshop delivery:</b> We delivered a 10-min presentation on ‘Evidence Based Practice and Shared Decision Making’ (using a PowerPoint presentation available on request). Participants watched two 7-min pre-recorded videos on ‘Interpretation of research evidence’ and ‘Interpretation of levels of evidence and strength of recommendations’ (these were also provided to participants after the workshop on request). Website links for these videos are available on request. Participants also watched a pre-recorded modelled role-play consultation demonstrating one example of what SDM might ‘look like’ in clinical practice (available at <a href="https://vimeo.com/273322988">https://vimeo.com/273322988</a>).</p> <p><b>Materials used in training standardised patients:</b> Standardised patients received a summary of the patient scenario (including details of the chief complaints, and relevant medical, family, and social history), and suggested opening statements and questions/treatment options to be discussed. This can be found in <b>Supplement 2</b>.</p>
4. What (Procedures)	<p>(1) Clinical Scenario considering the benefits and harms of knee arthroscopy [Small-group exercise]: We started the workshop by presenting a clinical scenario of a patient presenting to a GP with knee osteoarthritis and requesting arthroscopic surgery</p> <p>(2) BMJ Rapid Recommendations Clinical Practice Guideline [Small-group exercise]: Participants were presented with a relevant BMJ Rapid Recommendation Guideline (i.e. a trusted reliable source of pre-appraised evidence – this was selected as it contained all the data needed to build interactive exercises and is publicly available).</p> <p>(3) Evidence Based Practice and Shared Decision Making [10 min presentation]: Participants were briefly introduced to evidence based practice and shared decision making, including the principles of risk communication.</p> <p>(4) Applicability of Research Evidence [Small-group exercise]: Participants completed a relevant practical exercise to teach these competencies.</p> <p>(5) Interpretation of research evidence [Pre-recorded video]: Participants watched a 7-minute video about the interpretation of research evidence (including the interpretation of measure of association and effect, statistical significance versus clinical importance, and measures of uncertainty).</p>

TIDieR Items	Description
	<p>(6) Interpretation of research evidence [Small-group exercise]: Participants worked through several small group exercises to consolidate these competencies using examples from the pre-appraised evidence.</p> <p>(7) SDM role-play [Pre-recorded modelled role-play]: Participants watched a video of a patient-doctor consultation showing an example of what shared decision making might look like in clinical practice</p> <p>(8) SDM role-play [Small-group exercise role-play]: Participants completed a small group practical exercise to practice using shared decision making skills in a role-play patient-doctor consultation (one participant role-played a general practitioner, a trained standardised patient role-played a patient with knee osteoarthritis, and other -group members provided feedback).</p> <p>(9) Interpretation of levels of evidence and strength of recommendations [Pre-recorded video]: Participants watched a 7-minute video explaining the GRADE framework (The Grading of Recommendations Assessment, Development and Evaluation), different levels of quality of evidence (e.g. low, high) and strength of recommendations (e.g. strong, moderate), and its relevance to clinical decision-making.</p> <p>(10) Critical appraisal of a randomised controlled trial [Small-group exercise]: Participants applied these skills to critically appraise one of the primary randomised studies included in the pre-appraised evidence.</p> <p>(11) Interpretation of a forest plot [Small-group exercise]: Participants completed practical exercises about interpreting a forest plot.</p>
5. Who provides	This workshop was developed and delivered by three professors with extensive experience in teaching EBP and shared decision making (PG; CDM; TH), and a medical doctor undertaking doctoral research in EBP teaching (LA).
6. How	It was a face-to-face workshop which involved 2 small-groups (7 participants and a facilitator in each).
7. Where	The workshop was delivered in a seminar room at Bond University on the Gold Coast, Australia. The room was equipped with the required audio-visual facilities.
8. When and How much	The workshop was delivered on one occasion and lasted for an afternoon (5 hours; 12:00-17:00, which included time for lunch, afternoon tea and data collection for research purposes). See <b>Supplement 1</b> for the detailed workshop schedule.
9. Tailoring	All participants received the same workbook materials, attended the same lecture and pre-recorded videos, and participated in the small-group discussion. Questions from participants were answered and additional explanation provided as needed.
10. Modifications	No modifications were made during the delivery of the workshop, although at the end of it, some participants requested that the pre-recorded video presentations be provided to them (this was then done).
11. How well (Planned)	Adherence to the timing schedule was maintained by one of the authors (LA).
12. How well (Actual)	No fidelity measures were used.



## **Procedure**

At registration, participants were provided with their workshop workbook (**Supplement 1**). Before the workshop teaching commenced, participants completed a role-play consultation (as a GP) with a standardised patient. Participants were provided with a brief summary of the patient scenario, an extract from relevant pre-appraised evidence (as part of a decision aid and instructions about the task (**Supplement 2**)). Participants were given approximately 8 minutes to do the consultation. Two experienced professional standardised patients were trained to play the patient role in the scenario. They were provided with detailed information about the case scenario (e.g. presenting complaint, clinical history, and family history). The same procedure was followed after the workshop for the post-workshop consultation with a different, but comparable (in terms of the number of options to be discussed) clinical scenario to minimise the impact of repetition on observed outcomes. All consultations were audio-recorded.

## **Outcome measures and data collection**

*Participant feedback about the workshop:* At the end of the workshop, participants completed a feedback questionnaire on demographics (age, gender, health discipline, job role/position, any previous EBP training, and years of clinical experience) and workshop acceptability using 9 statements (see items in Figure S1), each rated using a 5-point Likert-scale (from strongly disagree = 1 to strongly agree = 5). In addition, there were 4 open-ended questions (the most beneficial aspect/s, least useful aspects, suggestions for improvement, and a proposed list of actions they intended to do in their practice).

*SDM and evidence communication skills.* We measured SDM skills by rating the consultations between participants and standardised patients (as described above) using the revised Observing Patient Involvement (OPTION) scale and Assessing Communication about Evidence and Patient Preferences (ACEPP) Tool. The OPTION scale has demonstrated good validity (i.e. construct and content validity) and reliability (i.e. inter-rater reliability and internal consistency). It consists of 12 items scored with a 5-point scale (the behaviour was not observed = 0; a minimal attempt is made to exhibit the behaviour = 1; the behaviour is demonstrated = 2; the behaviour is demonstrated to a good standard = 3; and the behaviour is executed to a high standard = 4)<sup>34 35</sup>. ACEPP tool has demonstrated good reliability (i.e. inter- and intra-rater reliability and internal consistency) in rating clinicians' ability to communicate the benefits and harms of treatment. It consists of 5 items scored with a 3-point scale (i.e. the behaviour was not observed = 0; observed to a basic level = 0.5; and observed to an extended level = 1)<sup>15 36</sup>. All audio-recordings were rated independently by two assessors (LA, MB). Disagreements were resolved by discussion and by involving a third assessor (TH) when needed. We also measured the duration of each consultation (in minutes) to explore whether applying SDM skills increases the length of consultation.

## **Data analysis and ethics approval**

Descriptive statistics were calculated for the demographic characteristics and pre- and post-workshop outcome measures. A two-sided paired t-distribution was used to calculate the 95% confidence intervals

of the mean differences between the pre- and post-workshop OPTION and ACEPP scores. As this is a pilot study, a formal sample size calculation was not conducted. As part of the study advertising, clinicians were informed that the workshop was free to attend, but that it was being conducted as part of a study and attendance would require completion of pre- and post-outcome measures. Clinicians provided written consent to participate on the day of the workshop. Ethics approval for the study was obtained from the Bond University Human Research Ethics Committee (LA03307).

## Results

A total of 14 clinicians participated in the workshop. All 14 completed the questionnaire and 13 provided consent to record their participation in the role-play consultations.

**Table 2** presents the participants' background characteristics. Most participants (n=10) were 18 to 44 years old; 9 were female; 6 were medical doctors; and 10 worked in hospitals. All participants had current clinical roles and 4 had both clinical and teaching roles.

**Table 2. Characteristics of workshop participants (N=14)**

Characteristics	n (%)
<b>Age</b>	
18-29 years	4 (29)
30-44 years	6 (43)
45-59 years	4 (29)
<b>Female</b>	9 (64)
<b>Discipline</b>	
Medical	6 (43)
Pharmacy	7 (50)
Nursing	1 (7)
<b>Workplace setting</b>	
Primary care	4 (29)
Hospital	10 (71)
<b>Role<sup>1</sup></b>	
Clinical	14 (100)
Teaching	4 (29)
Research	2 (14)
<b>Previous EBP workshop</b>	7 (50)
<b>Clinical experience – median (IQR) years</b>	<b>7 (3.6-18.3)</b>

Abbreviations: EBP: evidence-based practice; IQR: interquartile range

<sup>1</sup> Participants could choose more than 1 option

## Participant feedback

The feedback of participants about the workshop was largely positive (see Figure S1). All participants agreed or strongly agreed that the workshop had addressed their intended learning objectives; the

teaching and learning methods were appropriate; the small group sessions were useful and interactive; and the workshop has enhanced the participant's confidence and skills in practising EBP. The majority of participants expressed that the workshop was relevant to clinical practice (n=12); that workshop resources were appropriate (n=12); and that the time allocated for each session was adequate (n=10). Over half of the participants agreed that the workshop duration and pace were appropriate (n=9) and the workshop objectives were clear (n=8). Participants reported that 'small group teaching' and 'the use of the same clinical scenario to guide the teaching of all intended learning outcomes' were the most beneficial aspects of the workshop. However, 'the use of GP-focused clinical scenarios' was not useful. Participants reported that the workshop encouraged them to critically read journal articles relevant to their practice, carefully interpret and explain the evidence to patients, and apply SDM principles (including the search for decision aids for other commonly encountered conditions) in practice.

#### **Audio-recorded role-play consultations**

**Table 3** shows the mean (SD) before and after the workshop scores for OPTION and ACEPP measures and the mean change score, for the total scores and each item. The mean pre-workshop OPTION score was 32 (SD=9.9; range 13 to 46) out of 100 possible points and the post-workshop mean score was 38 (SD=8.1; range 25 to 54 points), with a mean difference of 5.5 (95% CI 1 to 9.9). The pre-workshop mean ACEPP score was 2.8 (SD=1.1; range 0.5 to 4) out of 5 possible points and the post-workshop mean score was 3.4 (SD=0.7; range 2 to 4.5 points), with a mean difference of 0.54 (95% CI 0.02 to 1.1).

**Table 3. Mean scores of OPTION and ACEPP pre- and post-workshop, and change scores (n=13).**

Outcome measures	Pre	Post	Pre-Post (change score)	
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (95% CI)
<b>OPTION scale<sup>1</sup> – total score</b>	32.2 (9.9)	37.7 (8.1)	5.5 (12)	5.5 (1.0 to 9.9)
Item 1: Draws attention to a problem that requires a decision making <sup>2</sup>	2.7 (0.9)	2.2 (1.1)	-0.46 (1.1)	-0.46 (-0.89 to -0.03)
Item 2: States that there is more than one way to deal with the problem <sup>2</sup>	1.7 (1.1)	1.6 (1)	-0.08 (1.4)	-0.08 (-0.63 to 0.48)
Item 3: Assesses patient's preferred approach to receiving information <sup>2</sup>	0.77 (0.6)	1.2 (0.6)	0.46 (0.9)	0.46 (0.12 to 0.8)
Item 4: Lists available options – can include the 'no option' <sup>2</sup>	1.9 (1)	2 (1)	0.15 (1.5)	0.15 (-0.41 to 0.72)
Item 5: Explains pros and cons of each option <sup>2</sup>	2.5 (0.9)	3.7 (0.5)	1.2 (1)	1.2 (0.77 to 1.5)
Item 6: Explores patient's expectations about managing the problem <sup>2</sup>	1.2 (0.4)	1.4 (0.5)	0.15 (0.7)	0.15 (-0.11 to 0.42)
Item 7: Explores patient's concerns/fears about managing the problem <sup>2</sup>	1 (0.4)	0.77 (0.6)	-0.23 (0.7)	-0.23 (-0.51 to 0.05)
Item 8: Checks the patient understanding of presented information <sup>2</sup>	0.62 (0.9)	0.38 (0.8)	-0.23 (1.1)	-0.23 (-0.65 to 0.19)
Item 9: Offers the patient explicit opportunities to ask questions <sup>2</sup>	1.2 (0.4)	1.1 (0.5)	-0.08 (0.5)	-0.08 (-0.27 to 0.11)
Item 10: Elicits patient's preferred level of decision making involvement <sup>2</sup>	0.77 (0.4)	0.77 (0.6)	0 (0.6)	0 (-0.22 to 0.22)
Item 11: Indicates the need for decision making/deferring stage <sup>2</sup>	1.2 (0.8)	1.6 (0.9)	-0.08 (1)	-0.08 (-0.48 to 0.32)
Item 12: Indicates the need to review the decision <sup>2</sup>	0.38 (0.5)	1.3 (1.5)	0.92 (1.6)	0.92 (0.33 to 1.52)
<b>ACEPP tool<sup>3</sup> - total score</b>	2.8 (1.1)	3.4 (0.7)	0.54 (1.3)	0.54 (0.02 to 1.06)
Describes the benefits of the treatment in terms of patient outcomes <sup>4</sup>	0.69 (0.3)	0.96 (0.1)	0.27 (0.3)	0.27 (0.14 to 0.4)
Describes the harms of the treatment in terms of patient outcomes <sup>4</sup>	0.85 (0.3)	0.81 (0.3)	-0.04 (0.4)	-0.04 (-0.18 to 0.11)
Discusses the probability or likelihood of benefit or harm either in words or numbers <sup>4</sup>	0.77 (0.4)	0.96 (0.1)	0.19 (0.5)	0.19 (0.01 to 0.38)
Tailors the individualised information the patient been provided <sup>4</sup>	0.15 (0.2)	0.23 (0.3)	0.08 (0.3)	0.08 (-0.06 to 0.21)
Mentions the source of research evidence <sup>4</sup>	0.35 (0.2)	0.38 (0.3)	0.04 (0.5)	0.04 (-0.14 to 0.22)

<sup>1</sup>Observing Patient Involvement Scale: score transformed to 0-100, with higher scores indicating a higher skill level

<sup>2</sup>score range 0 to 4, with higher scores indicating higher skill level

<sup>3</sup>Assessing Communication About Evidence and Patient Preferences: score range 0 to 5, with higher scores indicating higher skill level

<sup>4</sup>score range 0 to 1, with higher scores indicating higher skill level

OPTION scale items: (1) The clinician draws attention to a problem needing a decision-making process.; (2) The clinician states that there is more than 1 way to deal with an identified problem; (3) The clinician asks about the patient's preferred information format (words/numbers/visual display); (4) The clinician list options, including the choice of "no action/no antibiotics" if feasible; (5) The clinician explains the pros and cons of options to the patient (taking "no action" is an option); (6) The clinician explores the patient's expectations (or ideas) about how the problem/s are to be managed; (7) The clinician explores the patient's concerns/fears about how problem/s are to be managed; (8) The clinician checks that the patient has understood the information; (9) The clinician provides opportunities for the patient to ask questions; (10) The clinician specifically asks for the patient's preferred level of involvement in decision making; (11) The clinician indicates the need for a decision making (or deferring) stage; (12) Arrangements are made to review the decision (or the deferment).

ACEPP tool items: (1) The clinician describes the benefits of the treatment in terms of patient outcomes; (2) The clinician describes the harms of the treatment in terms of patient; (3) Has the probability or likelihood of benefit or harm been discussed either in Words or Numbers; (4) Has individualised information, tailored to the patient been provided?; (5) Has the source of research evidence been mentioned?.

## Discussion

In this study, we developed and piloted a half-day EBP workshop for clinicians, with a focus on teaching how to interpret pre-appraised evidence and incorporate it into discussions with patients as part of shared decision making. Feedback from participants after the workshop was very positive, with special emphasis on the usefulness of small-group sessions. There was a small increase in clinicians' skills in SDM and communicating evidence with patients from before to after the workshop.

### *Strengths and limitations*

This pilot study has several weaknesses. A major limitation is the small sample size and that clinicians volunteered to participate in the study, which may have resulted in a non-representative sample with the possibility that less motivated clinicians with little interest in EBP might not find this workshop as useful. The improvement in SDM and communicating evidence skills might be attributed to the learning curve for the standardised patient consultation (repeated encounter with a standardised patient consultation rather than the workshop). However, we used different patient scenarios for the pre- and post-consultations to minimise this potential impact. The clinical scenarios that we used in the EBP workshop (both in workshop activities and the role-plays) were GP-focused. Although not all the participants were GPs, the chosen scenarios (e.g. ear pain, knee pain) were able to be understood by any health professionals. Limitations also include the lack of a follow-up period and the use of before-after single-arm study design. This limits confidence in the findings and generalisability of the results.

Strengths of the study include measuring skill rather than just self-reported knowledge, the use of previously developed validated outcome measures to evaluate skills, and rating of consultations by two raters independently. Although the workshop was not limited to GPs as originally intended, we observed that the resultant interprofessional mixture of participants promoted interdisciplinary learning which has been shown to promote interprofessional collaboration and teamwork and enhance the development of interdisciplinary practice and improvement of quality services<sup>37</sup>.

### *Comparison with other studies*

Despite the repetitive calls to integrate SDM training into EBP training<sup>2 16</sup>, a recent systematic review of the interventions used in 85 EBP training trials found that the majority of EBP training interventions focused on detailed critical appraisal of individual studies, often to the exclusion of the interpretation and implementation of research evidence (i.e. SDM)<sup>21</sup>. Only one randomised trial has evaluated SDM as a component of EBP training curriculum for student clinicians and found it effective in improving student clinicians' skills in SDM (adjusted difference in OPTION score = 18.9, 95% CI 12.4 to 25.4) and communicating research evidence (adjusted difference in ACEPP = 0.9, 95% CI, 0.5 to 1.3)<sup>15</sup>. A review of 148 SDM training programs found that despite the encouraging increase interest in the development of SDM training programs, only a few training programs were rigorously evaluated<sup>6</sup>. A scoping review of 12

studies (only 1 randomised controlled trial<sup>15</sup>) evaluating SDM training in undergraduate medical training found that no evidence to indicate which training methods (e.g. duration, format, and clinical context) were most effective<sup>38</sup>. Similar, a recently updated Cochrane review of 87 studies evaluated interventions for increasing the use of SDM by clinicians showed that despite the increasing number of SDM interventions being evaluated, the certainty of the evidence of the effectiveness of SDM interventions is low or very low – which precluded any firm conclusions<sup>5</sup>. Similar to our findings, 6 of included studies (in the same Cochrane review) that have assessed interventions targeting clinicians showed a slight improvement in the observed SDM skills among clinicians (standardised mean difference; 0.70, 95% CI, 0.21 to 1.19)<sup>5</sup>. In 2005, Slawson and Shaughnessy indicated that critical appraisal skills are necessary but not sufficient alone for EBP<sup>22</sup>. Information management skills is critical to allow clinicians incorporating the best evidence into the real world of busy clinical practice<sup>22</sup>.

### *Implications on practice and research*

The presented study evaluated an EBP workshop which focused on two main needs of a contemporary EBP training program - the interpretation of synthesised pre-appraised research evidence (rather than appraising primary studies) and how to incorporate it into conversations with patients as part of SDM. The international consensus on the core competencies in EBP for health professionals has stressed the importance of clinicians having skills in SDM and critical interpretation and implementation of evidence from pre-appraised resources, rather than insisting upon detailed critical appraisal of individual studies<sup>25</sup>. This is considered a more realistic and pragmatic way to incorporate evidence into timely decisions in busy daily clinical practice and to facilitate patient-centred care through SDM<sup>25</sup>.

Implementing research evidence into practice involves major behaviour changes both at individual and system levels. A theory-led overview of 67 systematic reviews on the effectiveness of interventions in changing clinicians' behaviour found that educational interventions tend to be more effective when combined with other reinforcing interventions (e.g. action such as reminders, and audit and feedback)<sup>39</sup>. Therefore, we suggest that this type of EBP workshop may be most appropriate as part of a larger implementation strategy to enhance the use of research evidence in practice, since training is necessary but not sufficient alone for behaviour change.

Future EBP and SDM educational research should consider replicating our findings using larger sample size and various clinical scenarios (not just GP-focused). We also suggesting the use of mixed method approach to provide a thorough understanding of the results. We also propose a modular approach, with each module focussing on a clinical question type (e.g. intervention or diagnosis). Some of these modules might be more relevant to some disciplines than others.

### **Conclusions**

We found that a half-day EBP workshop which focusses on teaching SDM skills and pre-appraised research evidence is feasible and useful for busy clinicians with a modest impact in skills. However, the interpretation and generalisability of study findings are limited because of the small size and design of

this study. A larger controlled trial is warranted to evaluate the effectiveness of such an approach and to measure the change in behaviour over a longer-term.

## **Declarations**

**Ethics approval and consent to participate** The study was approved by Bond University Human Research Ethics Committee (LA03307).

**Availability of data and material** The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request

**Competing interests** None to declare

**Funding** L. Albarqouni is supported by an Australian Government Research Training Program Scholarship. The funders had no role in the design and conduct of the study, data collection, and analysis or in article preparation and approval

**Authors' contributions** LA, TH, and PG conceived the research idea. All authors contributed to the design of the study. LA drafted the original manuscript. All authors contributed to the revision of the paper and approved the final manuscript for submission.

**Acknowledgements:** The authors would like to acknowledge and thank all clinicians who participated in this study.



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